becker nachrichtentechnik

BSDU-4X32PR

Universal, Non-reflective 4 Section Multi RF Power Attenuator, 600…6000 MHz

Features

- Compact 19” design
- 32 bi-directional DUT RF ports
- High-isolation switch per DUT port
- Hot switching capabilty
- High power attenuators per DUT port
- 4 instrument-ports
- Non-reflective RF ports
- LAN remote interface
- Trigger input for synchronous switching applications

Applications

- Massive MIMO testing
- End-of-Line testing
- Product validation
- Suitable for antennas or multimedia products

At a Glance

The BSDU-4X32PR is a universal, bi-directional RF signal splitter/combiner designed for multi-signal routings. This device features 4 completely independent signal sections, each equipped with an instrument port and 8 corresponding Device Under Test (DUT) ports. All DUT ports are outfitted with high-power attenuators capable of efficient cooling. Additionally, each DUT port includes a high-isolation switch in its signal path to individually deactivate specific DUT signals.

Both RF DUT ports and instrument ports are non-reflective and matched to 50 ohms impedance when switched off.

Due to its high bandwidth capability, the BSDU-4X32PR can handle signals from a wide range of communication standards, including GSM900, GSM1800, UMTS, LTE, 5G, and IEEE 802.11a/b/g/n/ac.

Wear-Free RF Switching

Modern solid-state RF switches with high RF power handling and hot switching capabilities are employed in the BSDU-4X32PR, ensuring reproducible tests over a large number of switching cycles.

Calibration Channels

The device offers two separate channels for automated system calibration, corresponding to CH1 and CH32. These channels have three switching states: "through", "attenuation", and "off". In the "attenuation" state, the user can set an attenuation value via the software interface.

Remote Control with Trigger

For remote control, the BSDU-4X32PR offers a LAN interface and a trigger input. The device can be controlled using simple ASCII strings. A "queue" function enables preloading of switching configurations into the matrix device for triggered execution. Upon receiving a positive TTL trigger slope at the trigger input, the preloaded switch configuration is executed by hardware within microseconds. During the processing of a trigger, the trigger signal is held LOW for approximately 10 ms, and subsequent trigger signals are ignored until the trigger receiver is ready again.

Temperature Management

Housed in a compact 19”” housing, the BSDU-4X32PR is designed to manage the substantial thermal energy generated by high DUT signal power. The device is equipped with sufficient cooling fans controlled by a temperature feedback loop.

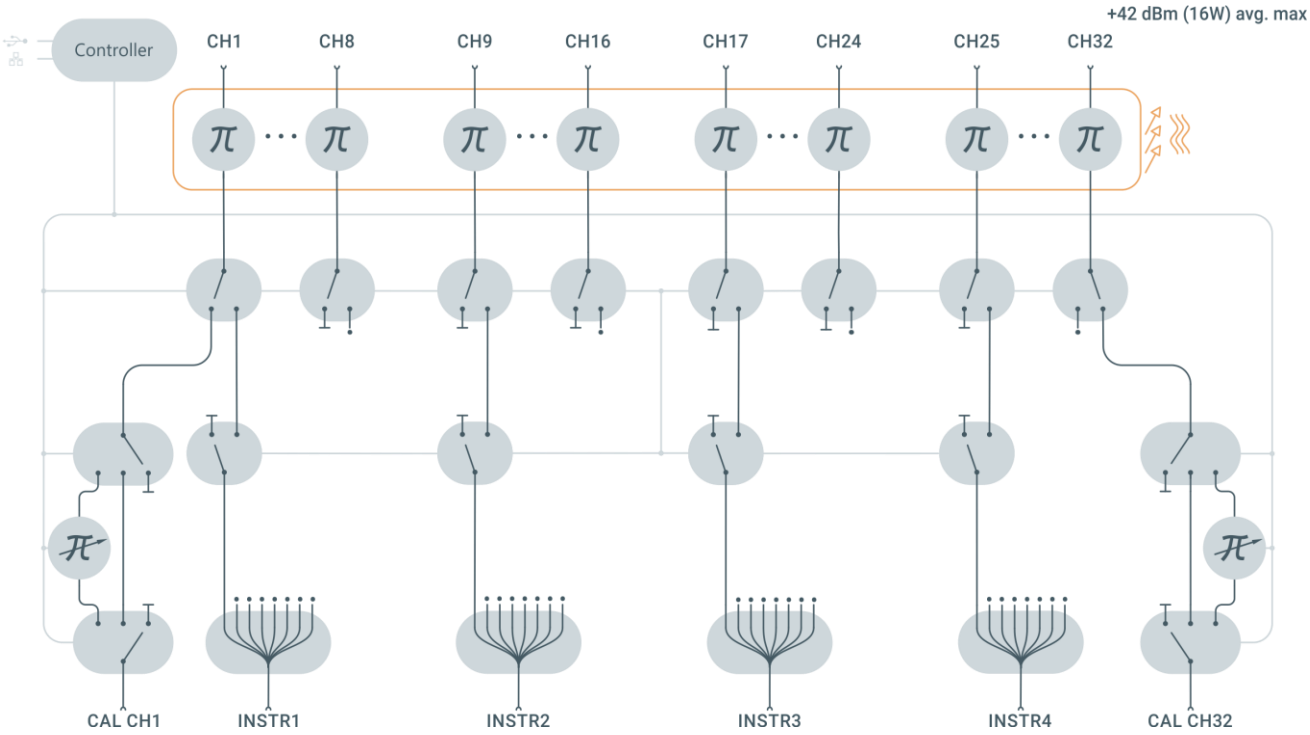
RF Specification

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
impedance	Z_{in} / Z_{out}		50		Ohm	
number instrument ports	N_{INSTR}		4			
number DUT ports	N_{DUT}		32			
number calibration ports	N_{MON}		2			
low frequency	f_{min}			600	MHz	
high frequency	f_{max}	6000			MHz	
main insertion loss	S_{21}	-24	-23	-22	dB	f = 600 MHz
	S_{21}	-26	-25	-24	dB	f = 3000 MHz
	S_{21}	-27	-26	-25	dB	f = 4000 MHz
	S_{21}	-28	-27	-26	dB	f = 6000 MHz
calibration loss (BYP)	S_{31}	-15	-14	-13	dB	f = 600 MHz
	S_{31}	-17	-16	-15	dB	f = 3000 MHz
	S_{31}	-17	-16	-15	dB	f = 4000 MHz
	S_{31}	-18	-17	-16	dB	f = 6000 MHz
calibration loss (ATT)	S_{31}	-24	-23	-22	dB	f = 600 MHz
	S_{31}	-26	-25	-24	dB	f = 3000 MHz
	S_{31}	-27	-26	-25	dB	f = 4000 MHz
	S_{31}	-29	-28	-27	dB	f = 6000 MHz
Calibration attenuation range	ATT	0		31	dB	Programmable in 1dB steps, attenuation mode, additional to S_{31} (ATT)
return loss	S_{11}		-15	-11	dB	
DUT isolation	ISO_{DUT}		-100	-80	dB	f ≤ 4 GHz, OFF state referred to ON state
			-55	-45	dB	Between two DUT ports in ON State
calibration isolation	ISO_{CAL}		-80	-65	dB	f ≤ 4 GHz, OFF state referred to ON state
RF power instr. ports	P_{INSTR}			+30	dBm	Average, input and output
	P_{INSTR}			+39	dBm	Peak (5G NR), input and output
RF power DUT ports	P_{DUT}			+42	dBm	Average, input, 1 DUT in ON state
	P_{DUT}			+51	dBm	Peak (5G NR), input 1 DUT in ON state
RF power DUT ports	P_{DUT}			+41	dBm	Average, input, all DUTs in ON state
	P_{DUT}			+50	dBm	Peak, input, all DUTs in ON state
Initial switching state	S_{INIT}	All off				After device startup
RF connectors	X_{RF}	SMA female				instruments, RF

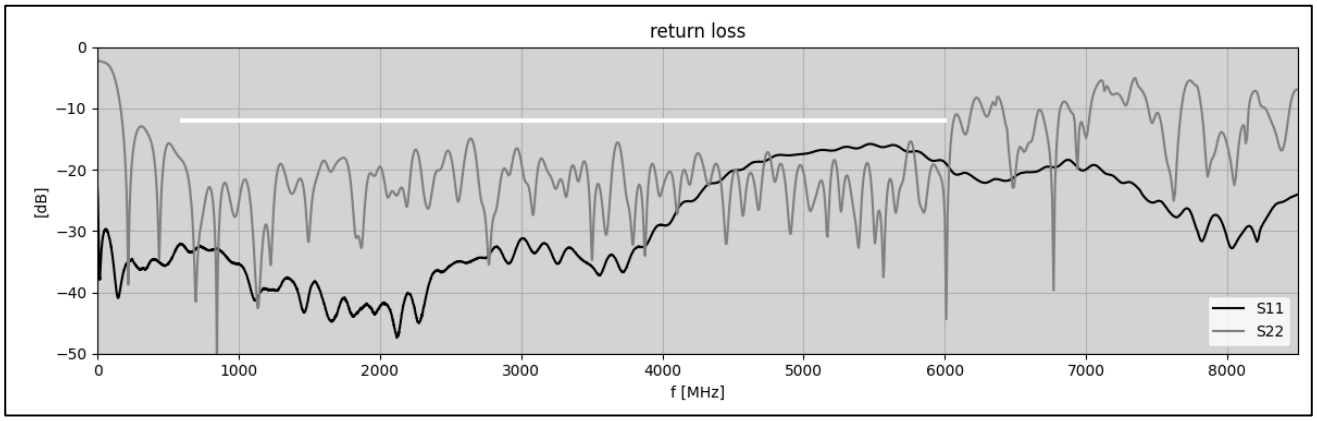
Common Specification

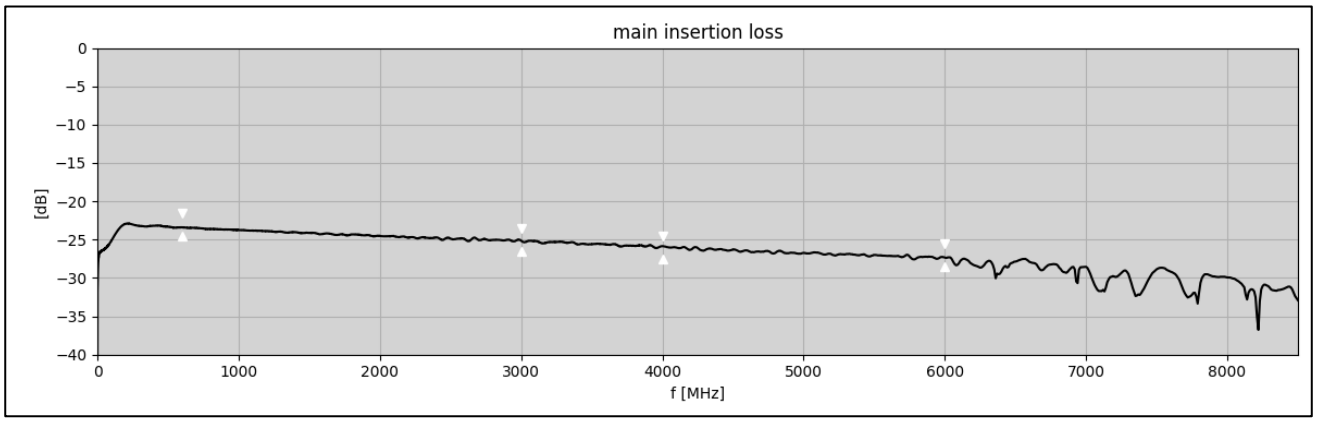
Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
power supply	u_{AC}	90	230	260	V	50 / 60 Hz
power consumption	P_{AC}		10	50	W	
power socket	X_{AC}	IEC-60320 C14				
dimensions	WxHxD	483 x 133 x 450 mm			mm	19”, 2 U
weight			6		kg	
remote interface	X_{REM}	RJ45 10/100BaseT				ASCII commands
operating temp. range	T_o	+ 5		+ 45	°C	
air outlet	X_{AIR}	device front				Warm air
ordering information	BSDU-4X32PR			P/N:		2408.6002.1

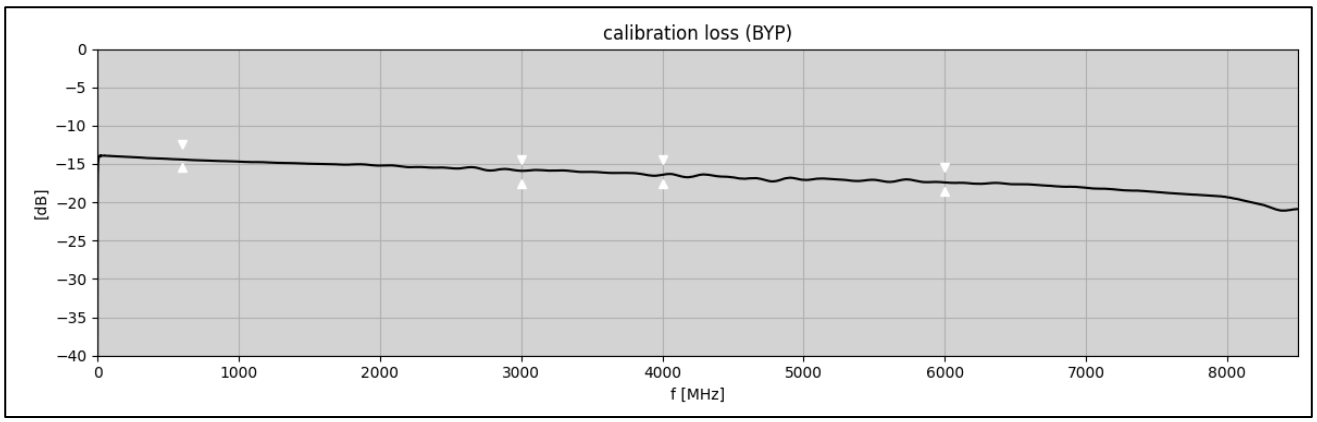
Functional Block Diagram

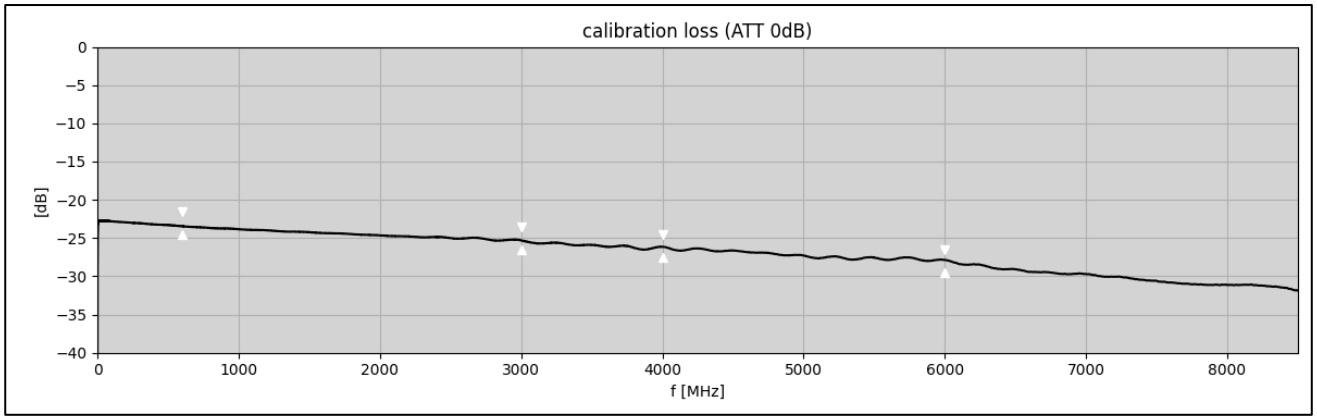


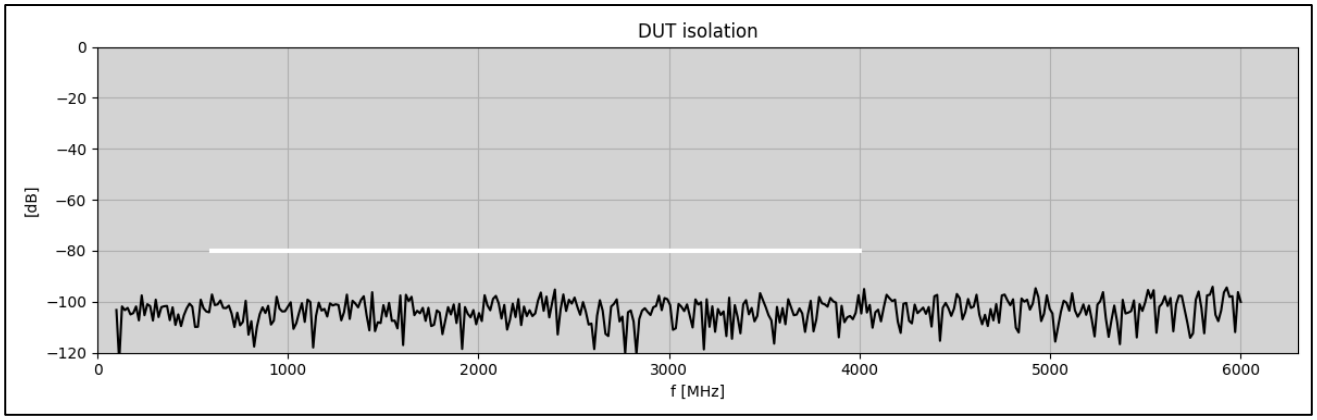
S-Paramters (typical responses)

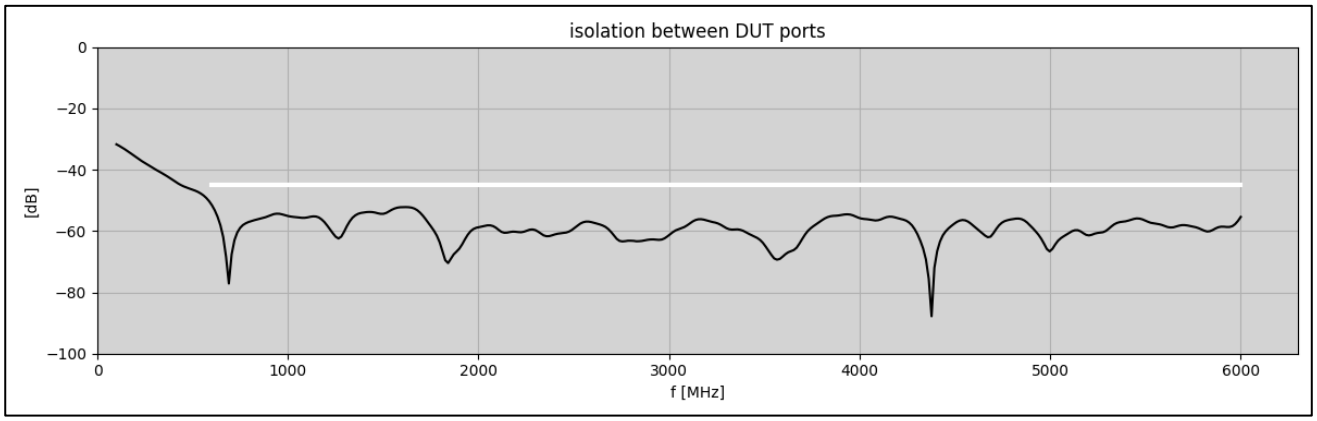


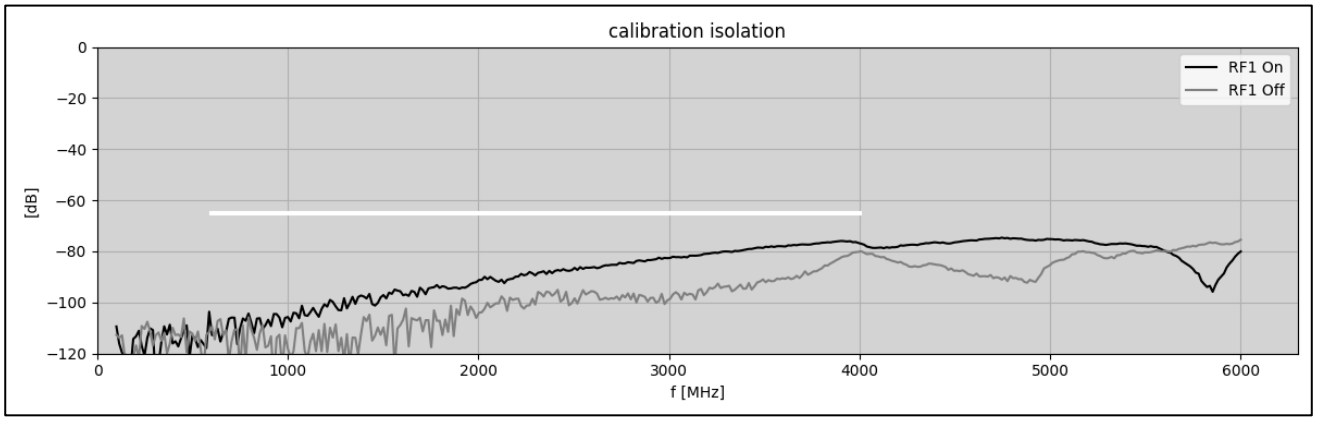







DUT isolation
0
−20
−40
−60
−80
−100
−120
[dB]
0
1000
2000
3000
4000
5000
6000
f [MHz]


isolation between DUT ports
0
−20
−40
−60
−80
−100
[dB]
0
1000
2000
3000
4000
5000
6000
f [MHz]

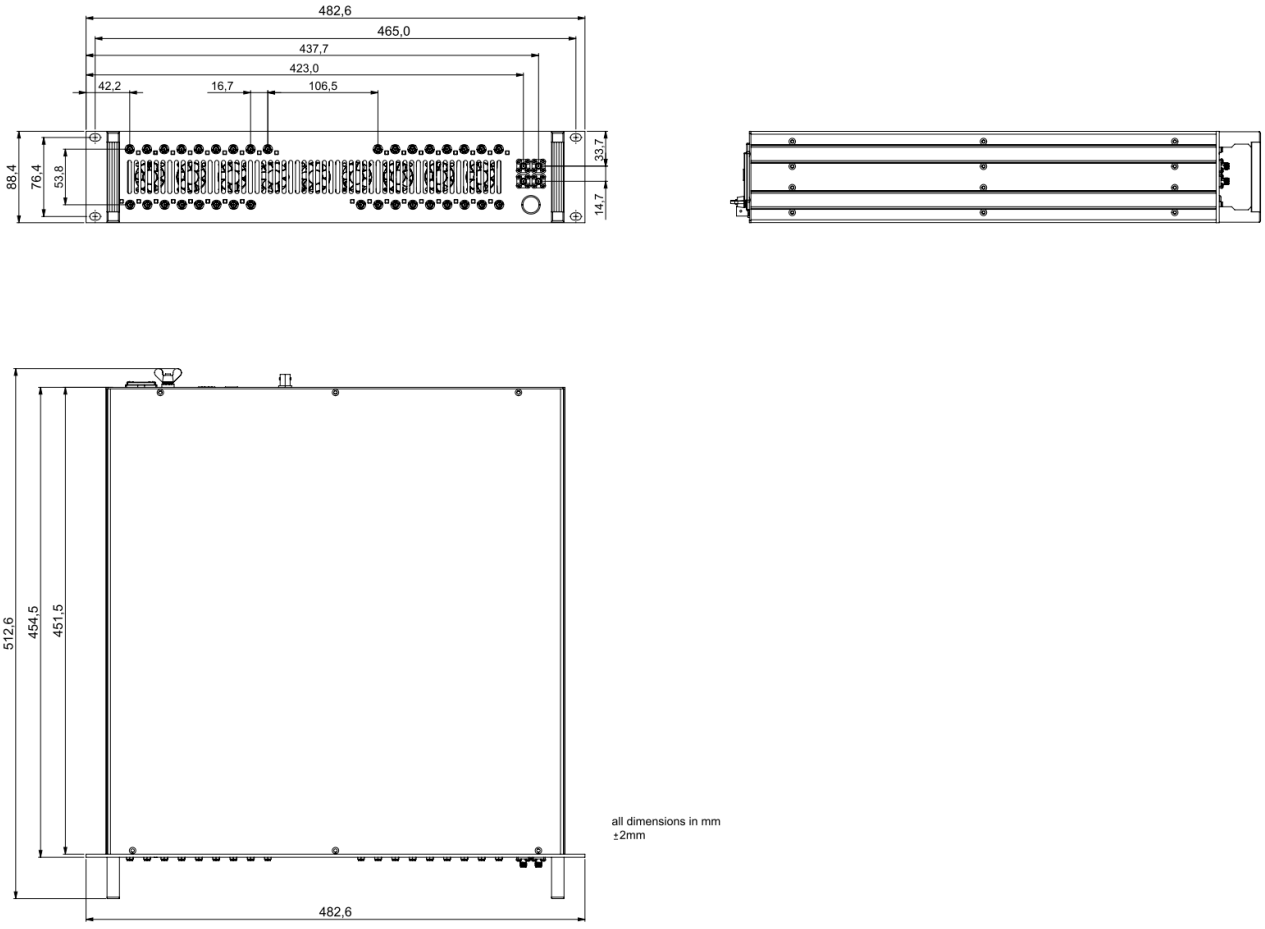

calibration isolation
RF1 On
RF1 Off
0
−20
−40
−60
−80
−100
−120
[dB]
0
1000
2000
3000
4000
5000
6000
f [MHz]

Appearances

Front View

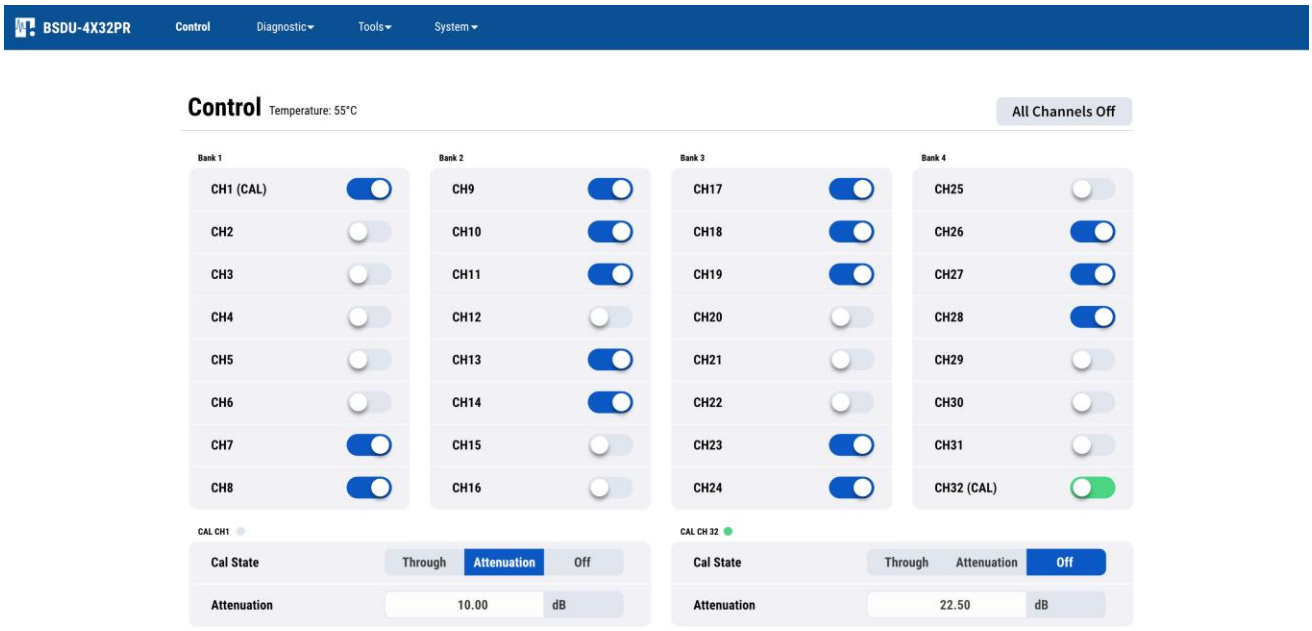
Rear View

Dimensions



Software Web Interface

Preliminary



Related Products

Product	P/N	Description
WSDU-1X8LR	1107.6152	High Dynamic 8 Way Multicoupler for Broadcast Signals 100 kHz … 4000 MHz AC or DC power supply
WSDU-2X4LR	1107.6252	High Dynamic 2 Section 4 Way Multicoupler for Broadcast Signals 100 kHz … 4000 MHz AC or DC power supply
WSDU-1X8R	1107.6102	High Dynamic 8 Way Multicoupler 100 kHz … 4000 MHz AC or DC power supply
WSDU-2X4R	1107.6202	High Dynamic 2 Section 4 Way Multicoupler 100 kHz … 4000 MHz AC or DC power supply
WSDU-1X8SR	1502.6102	High Dynamic 1X8 Shortwave Signal Distribution Unit 200 kHz … 30 MHz AC or DC power supply Variant with LAN remote interface with SNMPv2 trap function available
WSDU-2X4SER	2306.6102	2-Section 4-Way Signal Distribution Unit Section A: 200 kHz … 30 MHz Section B: 20… 8000 MHz AC or DC power supply Variant with LAN remote interface with SNMPv2 trap function available
WSDU-1X8ER	1501.6302	Extremely Wideband 1 to 8 Signal Distribution Unit 20…8000 MHz AC or DC power supply Variant with LAN remote interface with SNMPv2 trap function available
WSDU-2X4ER	1501.6202	Extremely Wideband 2 Section 1X4 Signal Distribution Unit 20 MHz… 8000 MHz AC or DC power supply Variant with LAN remote interface with SNMPv2 trap function available
WSDU-1X8UR	2109.6002	Ultra-Wideband 8-Way Signal Distribution Unit 100 kHz … 18 GHz AC or DC power supply LAN remote interface with SNMPv2 trap function
BSDU-1X8ER	2109.6202	Extremely Wideband Bidirectional 1X8 Signal Splitter/Combiner 500…9000 MHz
BSDU-2X4ER	2109.6252	Extremely Wideband Bidirectional 2 Section 1X4 Signal Splitter/Combiner 500…9000 MHz
BSDU-1X8AR	2109.6212	8 Way High Dynamic Signal Conditioning Multicoupler 500…9000 MHz AC or DC power supply LAN remote interface
BSDU-2X4AR	2109.6262	2 Section, 4 Way Bidirectional Signal Conditioning Splitter/Combiner 500…9000 MHz AC or DC power supply LAN remote interface
BSDU-4X32PR	2408.6002	Universal, Non-reflective 4 Channel RF Multi Power Attenuator 600 MHz … 6000 MHz LAN remote interface
BSDU-4X4R	2408.6102	4X4 Signal Splitter/Combiner 600 MHz … 6000 MHz
BSDU-4X8R	2408.6112	4X8 Signal Splitter/Combiner 600 MHz … 6000 MHz